

# CLAIMS

Therefore, having thus described the invention, at least the following is claimed:

1           1.       A method for providing automated diagnostic services for a cluster  
2 computer system comprising a plurality of nodes, each of the plurality of nodes  
3 providing an application to a plurality of clients, the method comprising the steps of:  
4           receiving information related to a plurality of drives associated with the  
5 plurality of nodes in the cluster computer system, the drives defining one or more  
6 logical volume groups;  
7           determining whether the drives conform to a predefined condition related to  
8 failover capability based on the information related to the drives, such that the one or  
9 more logical volume groups transition in the event of a failover; and  
10          providing a warning if the drives do not conform to the predefined condition.

1           2.       The method of claim 1, wherein the step of receiving information  
2 related to a plurality of drives and the step of providing a warning are via a  
3 communications network.

1           3.       The method of claim 1, wherein the step of receiving information  
2 related to a plurality of drives and the step of providing a warning are performed  
3 within the cluster computer system.

1           4.       The method of claim 1, wherein the step of determining whether the  
2 drives conform to a predefined condition comprises determining whether the drives  
3 are unique.

1           5.       The method of claim 1, wherein the step of determining whether the  
2 drives conform to a predefined condition comprises determining whether a plurality of  
3 drive paths are valid.

1           6.       The method of claim 1, wherein the step of determining whether the  
2 drives conform to a predefined condition comprises determining whether the one or  
3 more logical volume groups conform to a predetermined logical volume management  
4 condition.

1           7.       The method of claim 6, wherein the step of determining whether the  
2 one or more logical volume groups conform to a predetermined logical volume  
3 management condition comprises determining whether the logical volume numbers  
4 within the one or more logical volume groups are numbered sequentially.

1           8.       The method of claim 1, further comprising the steps:  
2                   determining which of the plurality of drives are shared drives;  
3                   initiating a read/write test on the shared drives.

1           9.     The method of claim 8, wherein the step of initiating a read/write test  
2 involves a nondestructively bounded pseudo random read/write test.

1           10.    The method of claim 8, further comprising the step of providing a  
2 warning if one of the shared drives fails the read/write test.

1           11.    The method of claim 10, further comprising the step of determining  
2 whether each of the plurality of nodes in the cluster computer system can access the  
3 shared drives.

1           12.    The method of claim 11, further comprising the step of providing a  
2 warning if one of the plurality of nodes in the cluster computer system cannot access  
3 one of the shared drives.

1           13.     A computer program for providing automated diagnostic services for a  
2 cluster computer system comprising a plurality of nodes, each of the plurality of nodes  
3 providing an application to a plurality of clients, the computer program comprising:  
4           a first portion of logic configured to receive information related to a plurality  
5 of drives associated with the plurality of nodes in the cluster computer system, the  
6 drives defining one or more logical volume groups;  
7           a second portion of logic configured to determine, based on the information  
8 related to the drives, whether the drives conform to a predefined condition related to  
9 failover capability such that the one or more logical volume groups transition in the  
10 event of a failover; and  
11           a third portion of logic configured to provide a warning if the drives do not  
12 conform to the predefined condition.

1           14.     The computer program of claim 13, wherein the first portion of logic is  
2 further configured receive the information related to a plurality of drives via a  
3 communications network and the third portion of logic is further configured to  
4 provide the warning via the communications network.

1           15.     The computer program of claim 13, wherein the first, second, and third  
2 portions of logic are embodied in cluster middleware controlling the cluster computer  
3 system.

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1           16.     The computer program of claim 13, wherein the first, second, and third  
2     portions of logic are embodied in an operating system associated with each of the  
3     plurality of nodes.

1           17.     The computer program of claim 13, wherein the second portion of  
2     logic is further configured determine whether the drives are unique.

1           18.     The computer program of claim 13, wherein the second portion of  
2     logic is further configured to determine whether a plurality of drive paths are valid.

1           19.     The computer program of claim 13, wherein the second portion of  
2     logic is further configured to determine whether the one or more logical volume  
3     groups conform to a predetermined logical volume management condition.

1           20.     The computer program of claim 19, wherein the second portion of  
2     logic is further configured to determine whether the logical volume numbers within  
3     the one or more logical volume groups are numbered sequentially.

1           21.     The computer program of claim 13, further comprising:  
2                   a fourth portion of logic configured to determine which of the plurality  
3     of drives are shared drives;  
4                   a fifth portion of logic configured to initiate a read/write test on the  
5     shared drives.

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1           22.     The computer program of claim 21, wherein the read/write test is a  
2     nondestructively bounded pseudo random read/write test.

1           23.     The computer program of claim 21, further comprising a sixth portion  
2     of logic configured to provide a warning if one of the shared drives fails the read/write  
3     test.

1           24.     The computer program of claim 23, further comprising a seventh  
2     portion of logic configured to determine whether each of the plurality of nodes in the  
3     cluster computer system can access the shared drives.

1           25.     The computer program of claim 24, further comprising an eighth  
2     portion of logic configured to provide a warning if one of the plurality of nodes in the  
3     cluster computer system cannot access one of the shared drives.

1           26.    A system for providing automated diagnostic services for a cluster  
2 computer system comprising a plurality of nodes, each of the plurality of nodes  
3 providing an application to a plurality of clients, the system comprising:  
4           means for receiving information related to a plurality of drives associated with  
5 the plurality of nodes in the cluster computer system, the drives defining one or more  
6 logical volume groups;  
7           means for determining, based on the information related to the drives, whether  
8 the drives conform to a predefined condition related to failover capability such that the  
9 one or more logical volume groups transition in the event of a failover; and  
10          means for providing a warning if the drives do not conform to the predefined  
11 condition.

1           27.    The system of claim 26, further comprising:  
2           means for determining which of the plurality of drives are shared  
3 drives;  
4           means for initiating a read/write test on the shared drives.

1           28.    The system of claim 27, wherein the read/write test involves a  
2 nondestructively bounded pseudo random read/write test.

1           29.    The system of claim 27, further comprising a means for providing a  
2 warning if one of the shared drives fails the read/write test.

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1           30.     The system of claim 29, further comprising a means for determining  
2     whether each of the plurality of nodes in the cluster computer system can access the  
3     shared drives.

1           31.     The system of claim 30, further comprising a means for providing a  
2     warning if one of the plurality of nodes in the cluster computer system cannot access  
3     one of the shared drives.

1           32.     A system for providing automated diagnostic services for a cluster  
2     computer system, the system comprising a computer having logic configured to:  
3                 receive information related to a plurality of drives associated with a plurality  
4     of nodes in the cluster computer system, the drives defining one or more logical  
5     volume groups;  
6                 determine, based on the information related to the drives, whether the drives  
7     conform to a predefined condition related to failover capability such that the one or  
8     more logical volume groups transition in the event of a failover; and  
9                 provide a warning if the drives do not conform to the predefined condition.

1           33.     The system of claim 32, wherein the computers is a server.

1           34.     The system of claim 32, wherein the logic is embodied in an operating  
2     system associated with the computer.



1           35.     The system of claim 32, wherein the logic is embodied in cluster  
2     middleware associated with the computer.

1           36.     The system of claim 32, wherein the computer further comprises a  
2     network interface card configured to communicate with a cluster interface.

1           37.     The system of claim 36, further comprising one or more clients in  
2     communication with the one or more computers via the cluster interface.

1           38.     The system of claim 32, wherein the computer further comprises a  
2     network interface configured to communicate with the cluster computer system via a  
3     communications network and wherein the information related to a plurality of drives  
4     is received via the communications network and the warning is provided to the cluster  
5     computer system via the communications network.

1           39.     The system of claim 32, wherein the logic is further configured to  
2     determine whether a plurality of drive paths are valid.

1           40.     The system of claim 32, wherein the logic is further configured to  
2     determine whether the one or more logical volume groups conform to a predetermined  
3     logical volume management condition.

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1           41.     The system of claim 32, wherein the logic is further configured to  
2     determine whether the logical volume numbers within the one or more logical volume  
3     groups are numbered sequentially.

1           42.     The system of claim 32, wherein the logic is further configured to:  
2     determine which of the plurality of drives are shared drives; and  
3     initiate a read/write test on the shared drives.

1           43.     The system of claim 42, wherein the logic is configured to provide a  
2     warning if one of the shared drives fails the read/write test.

1           44.     The system of claim 43, wherein the logic is further configured to  
2     determine whether each of the plurality of nodes in the cluster computer system can  
3     access the shared drives.

1           45.     The system of claim 44, wherein the logic is further configured to  
2     provide a warning if one of the plurality of nodes in the cluster computer system  
3     cannot access one of the shared drives.